Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A silicon casting apparatus comprising:

a mold for holding a silicon melt therein~~, comprising a bottom plate and a side plate raised upward from a peripheral edge of the bottom plate~~ and cooling and solidifying the silicon melt to produce silicon ingot;

a heating mechanism for heating the silicon melt and disposed with a distance from the mold kept constant above the mold; and

a cooling mechanism disposed below the ~~mold, for causing a temperature gradient in the silicon melt within the mold due to heating by the heating mechanism and cooling by the cooling mechanism, to subject the silicon melt to unidirectional solidification upward from the bottom plate side of the mold~~heating mechanism for cooling the silicon melt, characterized in that

the ~~mold and the heating mechanism are disposed with the distance therebetween kept constant, and the~~ cooling mechanism comprises a ~~bottom~~ cooling member for cooling ~~a bottom~~an outer surface of the mold ~~that is a lower surface of the bottom plate~~,

the ~~bottom~~ cooling member having a heat receiving surface ~~disposed opposed to~~brought into direct contact with a heat radiation surface that is

(~~1~~i) the ~~bottom~~outer surface of the mold, or

(~~2~~ii) a surface, other than a ~~placement surface, of a pedestal on which the mold is placed with the bottom surface thereof being in contact with the placement surface~~ contact surface with which the outer surface of the mold is brought into contact, of a heat transfer member comprising the contact surface, ~~and constituting a heat exchange region together with the heat radiation surface,~~

or arranged in close proximity thereto with a predetermined gap,

and is moved relative to the mold or the pedestal in order to change the heat exchange area ~~between~~, brought into contact with or arranged in close proximity to the heat radiation surface ~~and~~, of the heat receiving surface ~~that are opposed to each other~~.

2. (currently amended) The silicon casting apparatus according to claim 1, wherein the ~~bottom~~ cooling member comprises a bottom cooling member for cooling a bottom surface of the mold, the bottom cooling member having a heat receiving surface brought into direct contact with a heat radiation surface that is

(1) the bottom surface of the mold, or

(2) a surface, other than a placement surface serving as a contact surface, on which the mold is placed with the bottom surface of the mold being in contact therewith, of a pedestal serving as a heat transfer member comprising the placement surface,

or arranged in close proximity thereto with a predetermined gap,

and is moved ~~in a plane direction of the heat radiation surface~~ relative to the mold or the pedestal ~~while maintaining a state where the heat receiving surface thereof is kept in direct contact with the heat radiation surface~~ in order to change the heat exchange area, brought into contact with or arranged in close proximity to the heat radiation surface, of the heat receiving surface.

3. (currently amended) The silicon casting apparatus according to claim ~~1~~,2, wherein the bottom cooling member is moved in a plane direction of the heat radiation surface relative to the mold or the pedestal while maintaining a state where the heat receiving surface thereof is ~~spaced a predetermined gap apart from~~kept in direct contact with the heat radiation surface ~~in order to change the heat exchange area~~.

4. (currently amended) The silicon casting apparatus according to claim

~~3.~~2. wherein the bottom cooling member is moved in a plane direction of the heat radiation surface relative to the mold or the pedestal while maintaining a state where the heat receiving surface thereof is arranged in close proximity to the heat radiation surface with a predetermined gap.

5. (currently amended) The silicon casting apparatus according to claim 4, wherein the gap between the heat radiation surface and the heat receiving surface is not more than 10 mm.

6. (currently amended) The silicon casting apparatus according to claim ~~1,~~2, wherein a thermal conductivity of the pedestal is not less than 40 W/(m·K).

7. (currently amended) ~~The silicon casting apparatus according to claim 1, comprising~~

~~temperature detection unit for measuring a temperature of the mold, and~~

~~control unit for controlling a state of heating by the heating mechanism and the heat exchange area of the heat exchange region in the cooling mechanism on the basis of the temperature of the mold measured by the temperature detection unit, to control a solidification speed of the silicon melt.~~

The silicon casting apparatus according to claim ~~5,~~6, wherein the pedestal has one surface serving as the placement surface, a surface opposite to the placement surface ~~and a surface on the opposite side thereof~~ being parallel to ~~each other~~the placement surface, and is formed ~~to~~in the shape of a plate having a constant thickness, and the thickness is not less than one-sixth of a stretch length of a contact region between the placement surface and the bottom surface of the mold placed ~~thereon~~on the placement surface.

8. (currently amended) ~~The silicon casting apparatus according to claim 1, comprising inert gas discharge unit for spraying inert gas on the silicon melt held inside the mold, the inert gas discharge unit being disposed with a distance from~~

~~the mold and the heating mechanism kept constant.~~

The silicon casting apparatus according to claim 1, wherein the mold comprises a bottom plate and a side plate raised upward from a peripheral edge of the bottom plate, and the cooling member comprises a bottom cooling member for cooling a bottom surface that is a lower surface of the bottom plate of the mold, and a side cooling member for cooling a side surface that is an outer side surface of the side plate of the mold, the side cooling member having a heat receiving surface brought into direct contact with the side surface of the mold or arranged in close proximity thereto with a predetermined gap, and being moved relative to the mold in order to change the heat exchange area, brought into contact with or arranged in close proximity to the side surface of the mold, of the heat receiving surface.

9. (currently amended) ~~A~~ The silicon casting apparatus ~~comprising:~~

~~a mold for holding a silicon melt therein, comprising a bottom plate and a side plate raised upward from a peripheral edge of the bottom plate;~~

~~a heating mechanism disposed above the mold; and~~

~~a~~according to claim 8, wherein the side cooling ~~mechanism disposed below and beside the mold,~~

~~for causing a temperature gradient in the silicon melt within the mold due to heating by the heating mechanism and cooling by the cooling mechanism, to subject the silicon melt to unidirectional solidification upward from the bottom plate side of the mold, characterized in that~~

~~the mold and the heating mechanism are disposed with the distance therebetween kept constant,~~

~~the cooling mechanism comprises a bottom cooling member for cooling a bottom surface of the mold that is a lower surface of the bottom plate and a side cooling member for cooling a side surface of the mold that is an outer side surface of the side plate, and the side cooling member having a heat receiving surface disposed opposed to the side surface of the mold and constituting a heat exchange region together with the side surface, and is moved relative to the mold in order to~~

~~enlarge the heat exchange region from a lower part to an upper part in order in the height direction of the mold.~~member is moved in a height direction of the mold relative to the mold while maintaining a state where the heat receiving surface is kept in direct contact with the side surface of the mold.

10. (currently amended) The silicon casting apparatus according to claim ~~9~~,8, wherein the side cooling member ~~is moved in a plane direction of the heat radiation surface from the lower part to the upper part in order relative to the mold, while maintaining~~comprises a plurality of cooling members respectively having divisional heat receiving surfaces into which the heat receiving surface is divided in the height direction of the mold, each of the cooling members being relatively moved individually between a state where the divisional heat receiving surface ~~thereof~~ is ~~kept~~ in direct contact with the side surface of the mold~~, in order to enlarge the heat exchange region formed on the side surface of the mold from the lower part to the upper part in order in the height direction of the mold~~ or arranged in close proximity thereto with a predetermined gap and a state where they are spaced apart from each other.

11. (currently amended) ~~The silicon casting apparatus according to claim 9, wherein the side cooling member comprises a plurality of cooling sections respectively having divisional heat receiving surfaces into which the heat receiving surface opposed to the side surface of the mold is divided in the height direction of the mold, and each of the cooling sections is relatively moved individually between a state where the divisional heat receiving surface is contact with or near the side surface and a state where the divisional heat receiving surface is spaced apart from the side surface in order to enlarge the heat exchange region formed on the side surface of the mold form the lower part to the upper part in order in the height direction of the mold.~~ The silicon casting apparatus according to claim 8,

wherein the bottom cooling member has a heat receiving surface brought into direct contact with a heat radiation surface that is

(1) the bottom surface of the mold, or

(2) a surface, other than a placement surface on which the mold is placed, of the pedestal comprising the placement surface with the bottom surface of the mold being in direct contact therewith

or arranged in close proximity thereto with a predetermined gap,

and is moved relative to the mold or the pedestal in order to change the heat exchange area, brought into contact with or arranged in close proximity to the heat radiation surface, of the heat receiving surface.

12. (currently amended) The silicon casting apparatus according to claim ~~9,~~11, wherein the bottom cooling member ~~has a heat receiving surface disposed opposed to a heat radiation surface that is~~

~~(1)~~comprises a plurality of cooling members respectively having divisional heat receiving surfaces into which the heat receiving surface is divided at a center and a peripheral edge of the bottom surface of the mold ~~or (2) a surface, other than a placement surface, of a pedestal on which the mold is placed with the bottom surface thereof being in contact with the placement~~, each of the cooling members being relatively moved individually between a state where the divisional heat receiving surface is in direct contact with the heat radiation surface

~~and constituting a heat exchange region together with the heat radiation surface,~~ and is moved relative to the mold or the pedestal in order to change the ~~heat exchange area between the heat radiation surface and the heat receiving surface that are opposed to each other~~or arranged in close proximity thereto with a predetermined gap and a state where they are spaced apart from each other.

13. (currently amended) ~~The silicon casting apparatus according to claim 12, wherein the bottom cooling member comprises a plurality of cooling sections respectively having divisional heat receiving surfaces into which the heat receiving surface disposed opposed to the bottom surface of the mold and constituting the heat exchange region together with the bottom surface is divided at a center and a~~

~~peripheral edge of the bottom surface of the mold, each of the cooling sections is relatively moved individually between a state where the divisional heat receiving surface is contact with or near the bottom surface and a state where the divisional heat receiving surface is spaced apart from the bottom surface in order to enlarge the heat exchange region formed on the bottom surface of the mold from the center to the peripheral edge of the bottom surface in order.~~

The silicon casting apparatus according to claim 1, comprising

temperature detection unit for measuring a temperature of the mold, and

control unit for controlling a state of heating by the heating mechanism and a position of the cooling member relative to the mold on the basis of the temperature of the mold measured by the temperature detection unit.

14. (currently amended) The silicon casting apparatus according to claim ~~9, comprising~~1, comprising inert gas discharge unit, with a distance from the mold and the heating mechanism kept constant, for spraying inert gas on the silicon melt held inside the mold.

~~temperature detection unit for measuring a temperature of the mold, and~~

~~control unit for controlling a state of heating by the heating mechanism and the heat exchange area of the heat exchange region in the cooling mechanism on the basis of the temperature of the mold measured by the temperature detection unit to control a solidification speed of the silicon melt.~~

15. (currently amended) ~~The silicon casting apparatus according to claim 9, comprising inert gas discharge unit for spraying inert gas on the silicon melt held inside the mold, the inert gas discharge unit being disposed with a distance from the mold and the heating mechanism kept constant.~~

A method of producing ~~polycrystal~~ silicon ingot using the silicon casting apparatus according to ~~any one of claims 1 to 15,14,~~ claim 1, characterized by comprising the steps of: holding a silicon melt inside a mold ~~comprising a bottom plate and a side plate raised upward from a peripheral edge of the bottom plate~~; and

subjecting the silicon melt to unidirectional solidification ~~upward from the bottom plate side of the mold while increasing a heat exchange area of a heat exchange region formed between a heat radiation surface of at least one of the bottom plate side and the side plate side of the mold and a heat receiving surface of a cooling mechanism opposed to the heat radiation surface, disposed below the mold or below and beside the mold,~~from a lower part to an upper part of the mold by cooling the silicon melt from below of the mold by a cooling mechanism while heating the silicon melt by a heating mechanism disposed above the mold with a predetermined distance maintained therebetween as well as moving the cooling mechanism relative to the mold as a solid-liquid interface of the silicon melt ~~inside the mold rises due to cooling by the cooling mechanism, with the distance between a heating mechanism disposed above the mold and the mold kept constant~~rises due to cooling.

16. (currently amended) The method of producing silicon ingot according to claim 15, wherein the silicon casting apparatus comprises temperature detection unit and control unit, the control unit subjecting the silicon melt to unidirectional solidification from a lower part to an upper part of the mold while controlling a state of heating by the heating mechanism and a position of the cooling member relative to the mold on the basis of a temperature of the mold measured by the temperature detection unit.

17. (currently amended) ~~The method of producing silicon ingot according to claim 16, wherein the silicon melt is subjected to unidirectional solidification upward from the bottom plate side of the mold while controlling the state of heating by the heating mechanism and the heat exchange area of the heat exchange region of the cooling mechanism by the control unit on the basis of a temperature of the mold measured by the temperature detection unit.~~

The method of producing silicon ingot according to claim 15, wherein the silicon casting apparatus comprises inert gas discharge unit, for subjecting the silicon melt held inside the mold to unidirectional solidification from a lower part to

an upper part of the mold while spraying inert gas from the inert gas discharge unit on the silicon melt.

18. (cancelled)